

ABSTRACT

An engine is provided which includes various precise configuration parameters, including dimensions, shape and/or relative positioning of the combustion chamber features, resulting in a combustion process minimizing NOx emissions and particulates. The combustion chamber includes a spray angle relative to an inner bowl floor angle that maximizes the amount of fuel in contact with the inner bowl, in combination with one or more of the following: a vertical distance from the tip of the piston bowl to the injection orifices; a number of injection orifices; a swirl ratio; a vertical distance from the injection orifices to an inner face of the cylinder head; a distance from the piston top surface to the cylinder head; a radius of curvature of an outer bowl section; a radius of curvature at an edge of the piston bowl; a ratio of the piston bowl diameter to the cylinder diameter; and the cylinder diameter.